AMENDMENTS TO THE SPECIFICATION

IN THE SPECIFICATION:

Page 12

Please amend the paragraph beginning at line 14, through page 13, line 4 as indicated below:

In the process of calculating the target average setup gain $G(P_{in})$ at different input intensities described in Fig. 5, the gains $G(\lambda_1, P_{in\_1})$, $G(\lambda_2, P_{in\_1})$,..., $G(\lambda_n, P_{in\_1})$ are measured for specific wavelengths λ_1, λ_2,..., λ_n (where n is a positive integer) at an input intensity within the dynamic range (Step S401). Then, gain profile variations for the individual measurement wavelengths, namely differences between the gain at the maximum input intensity $G(\lambda_1, P_{in\_max})$ and the gain at the intensity for the measurement wavelengths, $\cancel{\Delta G_{\lambda 1, P1}=G(\lambda_1, P_{in\_1})}$ $\underline{\Delta G_{\lambda 1, P1}=G(\lambda_1, P_{in\_max})}-G(\lambda_1, P_{in\_1})$, $\cancel{\Delta G_{\lambda 2, P1}=G(\lambda_2, P_{in\_1})}$ $\underline{\Delta G_{\lambda 2, P1}=G(\lambda_2, P_{in\_max})}-G(\lambda_2, P_{in\_1})$,..., $\cancel{\Delta G_{\lambda n, P1}=G(\lambda_n, P_{in\_1})}$ $\underline{\Delta G_{\lambda n, P1}=G(\lambda_n, P_{in\_max})}-G(\lambda_n, P_{in\_1})$, are calculated (Step S402). The minimum ΔG_{min} is selected from among $\Delta G_{\lambda 1, P1}$, $\Delta G_{\lambda 2, P1}$..., $\Delta G_{\lambda n, P1}$ (Step S403), and $G(\lambda, P_{in})$, which determines the minimum value of $\cancel{\Delta G_{\lambda P}}$ $\underline{\Delta G_{\lambda, P}}$, is selected as the target average setup gain $G(P_{in})$ at the intensity (Step S404). After the process at Step S404, whether the measurement is completed is determined (Step S405). If the measurement for another input intensity is to be performed (Step S405, Yes), the input intensity is set to another value (step S406) and the processes at Steps S401 to S405 are repeated. On the other hand, if there is no measurement to be performed for any other input intensity (Step S405, No), the process returns to the flow described in Fig. 2.

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Please amend the paragraph beginning at line 12, through line 18 as indicated below:

At this stage, the target setup value of P''_{out}/P_{in} is determined in accordance with the procedure explained in the first embodiment. The function of making the target average setup gain value variable in accordance with changes in the input intensity can be realized by varying the value of the electrical signal level $P_{offset}(P_{in})$ supplied by the ~~gain-level compensating~~ gain-variation-level compensating circuit 22 circuit 22.

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Please amend the paragraph beginning at line 15, through line 29 as indicated below:

The operation of the optical amplifier illustrated in Fig. 9 will be explained. A full output light electrical signal of an electrical signal level P_{out} that is output from the optical-level detecting unit 3b is input into a ~~subtracting unit 11~~ subtracting unit 41. Meanwhile, an electrical signal of a gain compensation level P_{comp} that is predetermined as a constant and output from ~~a compensation level setting unit 12~~ the fixed-preset-level determining unit 42 is also input into the subtracting unit 41 and converted by the subtracting unit 41 to an electrical signal of an output compensation level expressed as $P_{out}'=P_{out}-P_{comp}$, which is then output to the constant gain control circuit. Here, the P_{comp} is determined to be the target average setup gain at the minimum input intensity within the input dynamic range, by following the procedure of setting the target average setup gain discussed in the first embodiment.

Please amend the paragraph beginning at line 30, through page 20, line 17 as indicated below:

Fig. 10 is a diagram for comparing the output spectrum property of the optical amplifier according to the fourth embodiment with the conventional technology. In this drawing, the waveform K3 represents the output property when conducting the conventional constant gain control, while the waveform K4 represents the output property when adopting the above described controlling unit using a gain-variation-level compensating circuit. As shown in this drawing, because the compensation level P_{comp} output from the ~~compensation level setting unit 12~~ fixed-preset-level determining unit 42 has a certain electrical level, its contribution decreases as the input signal level increases. Thus, the optimum target average setup gain in the input dynamic range can be offered simply by supplying a fixed electrical signal level. Because the gain-variation-level compensating circuit according to the present embodiment has a simple constitution that is sufficient to merely supply the fixed electrical signal level, it can be realized with a simple and inexpensive constitution such as a voltage divider that serves as a resistance if the subtracting unit is realized with a general operational amplifier, for example.

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Please amend the paragraph beginning at line 27, through line 33 as indicated below:

As explained above, with the optical amplifier according to the present embodiment, a gain compensation signal having an unchanged level is generated by the ~~compensation level setting unit~~ fixed-preset-level determining unit, and the gain compensation signal is subtracted

from the output monitor signal to be output. This realizes a variable gain controlling function in a simple fashion.

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Please amend the paragraph beginning at line 18, through page 22, line 3 as indicated below:

The operation of the optical amplifier illustrated in Fig. 11 will be explained. In the drawing, part of the input signal light that is input is diverged by the optical coupler 2a and combined with the offset-light source 51 by the optical coupler 2c. Thereafter, the input signal light intensity is detected by the optical-level detecting unit 3a, and the input signal light is converted to satisfy $P_{in}+P_{opt\_offset}$, where the offset component of the offset-light source 51 is added to the full input light electrical signal of an electrical signal level P_{in}. Meanwhile, the pumping light sent from the pumping-light source 4 is input into the rare earth-doped fiber 1 together with the input signal light by the ~~pumping-light source coupler 5-5~~ pumping-light source coupler 5, where the input signal light is amplified. Part of the amplified output signal light is diverged by the optical coupler 2b, the output signal light intensity of which is detected by the optical-level detecting unit 3b, and the output signal light is converted to a full output light electrical signal of an electrical signal level P_{out}.